Introduction to Computational Social Science: An exploration of social inequality

UNIQUE NUMBER

Semester

CLASS MEETS: [Time, Days, and Location]

Instructor: Huimin Xu (Huimin)
Office:
Pronouns: she/her/hers   Office hours: [time, days]
Email: and by appointment
Phone:

TA: [name and how you prefer to be addressed]
Office:
Pronouns: Office hours: [time, days]
Email: and by appointment
Phone:

Course Description

UNIVERSITY CATALOG COURSE DESCRIPTION

This is a graduate-level programming and research course.

PREREQUISITES FOR THE COURSE

It is an introductory course to teach how to conduct social science research with large-scale datasets for graduate students. You should have basic knowledge of statistics and data analysis, particularly data frames, variables, regression models, and graphs. I recommend you learn some basic undergraduate-level statistics and programming courses.

learning outcomes

1. By the end of the class, students will be able to deploy python programming to solve social problems.
2. Justify the right computational methods emotional analysis, network analysis, machine learning for specific social questions

FLAG COURSES

Quantitative Reasoning

HOW WILL YOU LEARN?

STATEMENT OF LEARNING SUCCESS

Your success in this class is important to me. We all learn differently, and everyone struggles sometimes. You are not, ever, the only one having difficulty! If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we will develop strategies to meet both your needs and the requirements of the course. I also encourage you to reach out to the student resources available through UT and I am happy to connect you with a person or Center if you would like.

TEACHING MODALITY INFORMATION

It is an in-person class. If you cannot attend the class due to emergency and need course recordings, please email me one week in advance. This class has multiple formats, e.g., lecture, lab and discussion, group learning projects and presentations.

COMMUNICATION

The course Canvas site can be found at utexas.instructure.com. Please email me through Canvas. You are responsible for ensuring that the primary email address you have recorded with the university is the one you will check for course communications because that is the email address that Canvas uses.

ASKING FOR HELP

You can ask questions via emails or make appointments during offices hours. As to technical programming questions, I suggest seeking help from teaching assistant firstly.

DIVERSITY, EQUITY AND INCLUSION

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed, and that the diversity that students bring to this class can be comfortably expressed and be viewed as a resource, strength and benefit to all students. Please come to me at any time with any concerns.

DISABILITY & ACCESS (D&A)

The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability & Access (D&A). Please refer to the D&A website for more information: http://diversity.utexas.edu/disability/. If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

COURSE REQUIREMENTS AND GRADING

REQUIRED MATERIALS

Book:

Tony Gaddis, Starting out with Python, 5th edition (2021)

Bit By Bit: Social Research in the Digital Age

This textbook is available online, so you do not need to purchase a physical copy.

Suggested papers:

In addition to these textbooks, I will also assign supplementary readings and individual journal articles. These papers use computational methods to explore social inequality problems.

Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. Nature, 504(7479), 211-213.

Ross, M. B., Glennon, B. M., Murciano-Goroff, R., Berkes, E. G., Weinberg, B. A., & Lane, J. I. (2022). Women are credited less in science than men. Nature, 608(7921), 135-145.

Freeman, R. B., & Huang, W. (2015). Collaborating with people like me: Ethnic co authorship within the United States. Journal of Labor Economics, 33(S1), S289-S318.

Myers, K. R., Tham, W. Y., Yin, Y., Cohodes, N., Thursby, J. G., Thursby, M. C., ... & Wang, D. (2020). Unequal effects of the COVID-19 pandemic on scientists. Nature human behavior, 4(9), 880-883.

Wu, L., Wang, D., & Evans, J. A. (2019). Large teams develop and small teams disrupt science and technology. *Nature*, *566*(7744), 378-382.

Xu, H., Zhang, Z., Wu, L., & Wang, C. J. (2019). The Cinderella Complex: Word embeddings reveal gender stereotypes in movies and books. PloS one, 14(11), e0225385.

REQUIRED DEVICES

A laptop is required for class participation. Please bring your laptop to each class. Please install the anaconda (https://www.anaconda.com/) on your laptop in advance.

CLASSROOM EXPECTATIONS

Class attendance
Attendance is not a part of the final grade, but you should request for absence in advance and inform me via emails.

Class participation
Class participation is not a part of the final grade, but I expect you to actively participate in the class.

Behavior expectations [State the guidelines and ground rules for appropriate behavior. You can reference a class-specific code of conduct (some instructors ask students to write this during the first week of class) or, more formally and officially, Section 11-400 of the Institutional Rules in the GIC.]

Professional Standards [List and describe any professional standards that apply in your school or to the subject being studied in your course.]

ASSIGNMENTS

The following table represents how you will demonstrate your learning and how we will assess the degree to which you have done so.

Assignments	Points Possible	Percent of Total Grade
1.3 One Test	20	20%
2.Project Proposal (2 pages)	20	20%
3.Final Project (10 pages)	60	60%

Test 1: Clean dataset

We will have a test for one hour in class. This exam is to test your knowledge you have learnt in the first beginning weeks.

The original is dataset https://docs.openalex.org/: where you can use api to select the topics, fields, and journals that you are interested in.

1. Clean the dataset. At minimum, you should:
    1. Fill or remove the missing data (NA)
    2. Make the variables all consistent in casing, formats
2. Run the following descriptive/answer the following questions:
    1. What is the scale of your dataset ?
    2. What is the average and standard deviation of each variable?
3. Run a regression model. Summarize the results of two variables below your analysis.

For this assignment, you must share a .csv file for the processed dataset and a .html file for your coding part to show your results and codes.

Assignments 2: Proposal

In your final project, you will conduct a computational analysis based on what you have learned in the class. To ensure you are on track regarding this project, you are required to complete a proposal for your final project. Your proposal should be around 2 pages (800-1000 words). By the time you write your proposal, you should know the general area of research you want to study, how you plan to collect your data, and what analysis you intend to conduct. The research questions you answer in your project should be about social inequalities. You are required to apply Python on the large-scale dataset https://docs.openalex.org/ to answer the problem.

Assignments 2: Final Paper

Your final paper will test your ability in summarizing related literature, posing a research question, collecting data, cleaning the data, performing an analysis in python, and presenting the results. Your final paper should be around 10 pages (4000-5000 words). You are required to share your code and data for the paper (you can do so using GitHub or google drive)

The outline of the paper should be as follows:

1. Introduction
2. Literature Review - Include your hypotheses or research questions here
3. Methods - Justify your data selection strategy and specify your data wrangling steps and method selection
4. Results
    1. Begin with a descriptive analysis
    2. The analysis with our computational results.
5. Conclusion/Discussion
6. Reference

Grades Rubric

Parts	Expectations	Score Percentage
Introduction	Your introduction clearly describes your research topic and explains why a computational analysis would be beneficial to this body of research	20%
Literature Review	Your literature review discusses relevant theories and mentions in clear structure.	10%
Methods	Your methods describe your data collection strategy, your data wrangling steps, and your data analysis steps.	20%
Results	Your results address your RQs and hypotheses. You should have visualization of your results.	20%
Conclusion	Your conclusion explains the relevance of your analysis and connects it to the literature that you have mentioned. You can also point out the limitations and future directions.	10%
Code	You include your data collection code, your data analysis code, your data wrangling code, and your data analysis code. You make your code public.	20%

LATE WORK AND MAKING UP MISSED WORK

If you are concerned about submitting your assignment late, please reach out to me in advance so that we can discuss an extension before the deadline. Otherwise, you will lose five points.

ABSENCES

Attendance is not part of work. But I encourage you to attend every class.

GRADE BREAKS

Grade	Cutoff
A	94%
A-	90%
B+	87%
B	84%
B-	80%
C+	77%
C	74%
C-	70%
D+	67%
D	64%
D-	60%
F	<60%

COURSE OUTLINE

All instructions, assignments, readings, rubrics and essential information will be on the Canvas website at utexas.instructure.com. Check Canvas regularly. **Changes** to the schedule may be made at my discretion if circumstances require. I will announce any such changes in class and will also communicate them via a Canvas announcement. It is your responsibility to note these changes when announced, and I will do my best to ensure that you are notified of changes with as much advance notice as possible.

[Syllabus must include all major course requirements and assignments, along with the dates of exams and assignments that count for 20% or more of the class grade. Also, recall that per the General Information Catalog no exam counting for more than 30% of the final course grade may be given during the last week of class, or during no-class days/reading days preceding the final exam period.]

Week	Date	Day	Class Topic	Out of Class Activities	Assignments Due
1.			Course Introduction, Python Introduction		
2.			Data structure, Data cleaning		
3.			Descriptive analysis, Regression Model	Preparing for test in class	
4.			Test in class and question part	Read chapter 3 research question . Bit By Bit: Social Research in the Digital Age	Assignment 1
5.			Research question, Book reading about what are social science questions	Read Larivière et al. (2013) for social inequality problems	
6.			Paper reading about different social inequalities		
7.			Discussion about research question		Assignment 2
8.			Natural Language Processing and Relevant paper sharing		
9.			Network Analysis and Relevant paper sharing		
10.			Unsupervised Machine Learning and Relevant paper sharing		
11.			Machine Learning and Relevant paper sharing	Read Wu et al. (2019) for visualization	
12.			Visualization and Relevant paper sharing		

13.		Discussion about final paper progress		
14.		Presentation about final paper progress		Assignment 3

Course Policies and Disclosures

ACADEMIC INTEGRITY EXPECTATIONS

Students who violate University rules on academic misconduct are subject to the student conduct process and potential disciplinary action. A student found responsible for academic misconduct may be assigned both a status sanction and a grade impact for the course. The grade impact could range from a zero on the assignment in question up to a failing grade in the course. A status sanction can range from probation, deferred suspension and/or dismissal from the University. To learn more about the academic integrity standards, tips for avoiding a potential academic misconduct violation and the overall conduct process, please visit the Student Conduct and Academic Integrity website at: http://deanofstudents.utexas.edu/conduct.

[It is strongly recommended that you outline any individual expectations for assignment completion- including parameters around group work, authorized resources, citation requirements, etc. in the assignment directions. Clear and detailed expectations not only reduce the likelihood of a possible violation, but they also aid the Student Conduct team in holding students accountable that fail to adhere to the assignment directions.]

CONFIDENTIALITY OF CLASS RECORDINGS

[If class recordings that include student personally identifiable information are to be made, UT Legal has indicated that the following disclosure should be included in the syllabus and wherever recordings are posted.] Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

GETTING HELP WITH TECHNOLOGY

Students needing help with technology in this course should contact the ITS Service Desk or [insert contact information for your local support unit(s) and for course materials, software, hardware, or other technology used in your course].

CONTENT WARNING

OUR CLASSROOM PROVIDES AN OPEN SPACE FOR THE CRITICAL AND CIVIL EXCHANGE OF IDEAS. SOME READINGS AND OTHER CONTENT IN THIS COURSE WILL INCLUDE TOPICS THAT SOME STUDENTS MAY FIND OFFENSIVE AND/OR TRAUMATIZING. I'LL AIM TO FOREWARN STUDENTS ABOUT POTENTIALLY DISTURBING CONTENT AND I ASK ALL STUDENTS TO HELP TO CREATE AN ATMOSPHERE OF MUTUAL RESPECT AND SENSITIVITY.

[BEST PRACTICE DISCUSSIONS AROUND CONTENT WARNINGS ALSO SUGGEST INCLUDING TAGS OR OTHER WARNINGS ON THE COURSE OUTLINE (ABOVE) NEXT TO THE ASSIGNED MATERIAL. FURTHER DISCUSSION OF CONTENT WARNING CAN BE FOUND AT THIS PAGE.]

BASIC NEEDS SECURITY

Any student who faces challenges securing their food or housing and believes this may affect their performance in the Any student who faces challenges with food insecurity or financial hardship and believes this may affect their performance in the course is urged to visit UT Outpost for support. UT Outpost, is a free on-campus food pantry and career closet for all currently enrolled UT students. Furthermore, if you are comfortable notifying me, please do so, as I may have additional resources I can share.

SHARING OF COURSE MATERIALS IS PROHIBITED

[Anyone concerned about the unauthorized sharing of their course materials through online sites should add the following statement to their syllabus. Including this statement regarding the posting and/or use of your course content by students establishes a proactive directive to students that is helpful to the office of Student Conduct and Academic Integrity in administering the conduct process should the material be posted in opposition to your written directive.]

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class without explicit, written permission of the instructor. Unauthorized sharing of materials promotes cheating. The University is aware of the sites used for sharing

materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in initiation of the student conduct process and include charge(s) for academic misconduct, potentially resulting in sanctions, including a grade impact.

RELIGIOUS HOLY DAYS

By UT Austin policy, you must notify me of your pending absence as far in advance as possible of the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

NAMES AND PRONOUNS

Class rosters are provided to the instructor with the student's legal name, unless they have added a "chosen name" with the registrar's office, which you can do so here. I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the pronouns you have asked to be used for you (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit this site. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender identity & expression, and nationalities. More resources available on the Gender and Sexuality Center's website, www.utgsc.org.

LAND ACKNOWLEDGMENT

I WOULD LIKE TO ACKNOWLEDGE THAT WE ARE MEETING ON THE INDIGENOUS LANDS OF TURTLE ISLAND, THE ANCESTRAL NAME FOR WHAT NOW IS CALLED NORTH AMERICA. MOREOVER, I WOULD LIKE TO ACKNOWLEDGE THE ALABAMA-COUSHATTA, CADDO, CARRIZO/COMECRUDO, COAHUILTECAN, COMANCHE, KICKAPOO, LIPAN APACHE, TONKAWA AND YSLETA DEL SUR PUEBLO, AND ALL THE AMERICAN INDIAN AND INDIGENOUS PEOPLES AND COMMUNITIES WHO HAVE BEEN OR HAVE BECOME A PART OF THESE LANDS AND TERRITORIES IN TEXAS.

University Resources for Students

DISABILITY & ACCESS (D&A)

[This required syllabus content is repeated from above. It may be included in either place, or both.]

The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability & Access (D&A). Please refer to the D&A website for more information: http://diversity.utexas.edu/disability/. If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

COUNSELING AND MENTAL HEALTH CENTER (CMHC)

We all benefit from support during times of struggle. Know you are not alone. If you are experiencing signs of stress, anxiety, depression, academic concerns, loneliness, difficulty sleeping, or any other concern impacting your well-being – you are strongly encouraged to connect with CMHC. The Counseling and Mental Health Center is located on campus and provides a wide variety of mental health services to UT students including crisis services, counseling services with immediate support and well-being resources. Additionally, CARE Counselors are located within each of the academic schools and colleges. These counselors are familiar with the concerns that are unique to their unit's students. For more information on CMHC, visit cmhc.utexas.edu or call 512-471-3515.

UNIVERSITY HEALTH SERVICES (UHS)

Your physical health and well-being are a priority. University Health Services is the on-campus medical facility providing high quality medical care and patient education to UT students. Services offered include general medicine, specialty clinics including the gynecology clinic, sports medicine, nutrition services, allergy, immunization and travel health and physical therapy, an urgent care, a 24/7 nurse advice line, and a lab and radiology services. For additional information, visit healthyhorns.utexas.edu or call 512-471-4955.

SANGER LEARNING CENTER

Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit https://ugs.utexas.edu/slc or call 512-471-3614 (JES A332).

STUDENT EMERGENCY SERVICES (SES)

Student Emergency Services in the Office of the Dean of Students helps students and their families during difficult or emergency situations. Assistance includes outreach, advocacy, intervention, support, and referrals to

relevant campus and community resources. If you need to be absent from class due to a family emergency, medical or mental health concern, or academic difficulty due to crisis or an emergency situation, you can work with Student Emergency Services. SES will document your situation and notify your professors. Additional information is available at https://deanofstudents.utexas.edu/emergency/ or by calling 512-471-5017.

Important Safety Information

If you have concerns about the safety or behavior of fellow students, TAs or professors, contact BCCAL (the Behavior Concerns and COVID-19 Advice Line) at https://safety.utexas.edu/behavior-concerns-advice-line or by calling 512-232-5050. Confidentiality will be maintained as much as possible, however the university may be required to release some information to appropriate parties.

CLASSROOM SAFETY AND COVID-19

- For any illness, students should stay home if they are sick or contagious, not only to stop the spread, but also to prioritize their personal well-being.
- UHS provides symptomatic COVID-19 testing for students. Schedule your appointment by calling 512-471-4955 or online within the MyUHS patient portal. Learn more about symptomatic COVID-19 testing here.
- Disposable masks are available for students at the William C. Powers, Jr. Student Activity Center and Texas Union hospitality desks.
- The exposure action chart offers guidance on what to do if you have been exposed to someone who has COVID-19 or if you test positive. If you experience symptoms, stay home and isolate and follow the instructions for symptomatic in the chart.
- Stay up to date on COVID-19 vaccinations by getting all available boosters when eligible. Vaccines are available through University Health Services.
- Additionally, UHS maintains up to date resources on COVID-19, which can be found here:
- COVID-19 Information and Resources

CARRYING OF HANDGUNS ON CAMPUS

Texas' Open Carry law expressly prohibits a licensed to carry (LTC) holder from carrying a handgun openly on the campus of an institution of higher education such as UT Austin. Students in this class should be aware of the following university policies:

- Students in this class who hold a license to carry are asked to review the university policy regarding campus carry.

- Individuals who hold a license to carry are eligible to carry a concealed handgun on campus, including in most outdoor areas, buildings and spaces that are accessible to the public, and in classrooms.
- It is the responsibility of concealed-carry license holders to carry their handguns on or about their person at all times while on campus. Open carry is NOT permitted, meaning that a license holder may not carry a partially or wholly visible handgun on campus premises or on any university driveway, street, sidewalk or walkway, parking lot, parking garage, or other parking area.
- Per my right, I prohibit carrying of handguns in my personal office. Note that this information will also be conveyed to all students verbally during the first week of class. This written notice is intended to reinforce the verbal notification, and is not a "legally effective" means of notification in its own right.

TITLE IX DISCLOSURE

[If this disclosure is included in the syllabus, the Title IX office has specificed the following wording.] Beginning January 1, 2020, Texas Education Code, Section 51.252 (formerly known as Senate Bill 212) requires all employees of Texas universities, including faculty, report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, written forms, applications, one-on-one conversations, class assignments, class discussions, or third-party reports) must report it to the Title IX Coordinator. Before talking with me, or with any faculty or staff member about a Title IX related incident, please remember that I will be required to report this information.

Although graduate teaching and research assistants are not subject to Texas Education Code, Section 51.252, they are mandatory reporters under federal Title IX regulations and are required to report a wide range of behaviors we refer to as sexual misconduct, including the types of misconduct covered under Texas Education Code, Section 51.252. Title IX of the Education Amendments of 1972 is a federal civil rights law that prohibits discrimination on the basis of sex – including pregnancy and parental status – in educational programs and activities. The Title IX Office has developed supportive ways and compiled campus resources to support all impacted by a Title IX matter.

If you would like to speak with a Case Manager for Support and Resources, who can provide support, resources or academic accommodations, in the Title IX Office, please email supportandresources@austin.utexas.edu. A Case Manager can also provide support, resources and accommodations for pregnant, nursing, and parenting students.

For more information about reporting options and resources, visit http://www.titleix.utexas.edu/, contact the Title IX Office via email at titleix@austin.utexas.edu, or call 512-471-0419.

CAMPUS SAFETY

The following are recommendations regarding emergency evacuation from the Office of Campus Safety, 512-471-5767,

- Students should sign up for Campus Emergency Text Alerts at the page linked above.

- Occupants of buildings on The University of Texas at Austin campus must evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.

- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.

- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.

- In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

- For more information, please visit the Office of Emergency Management.